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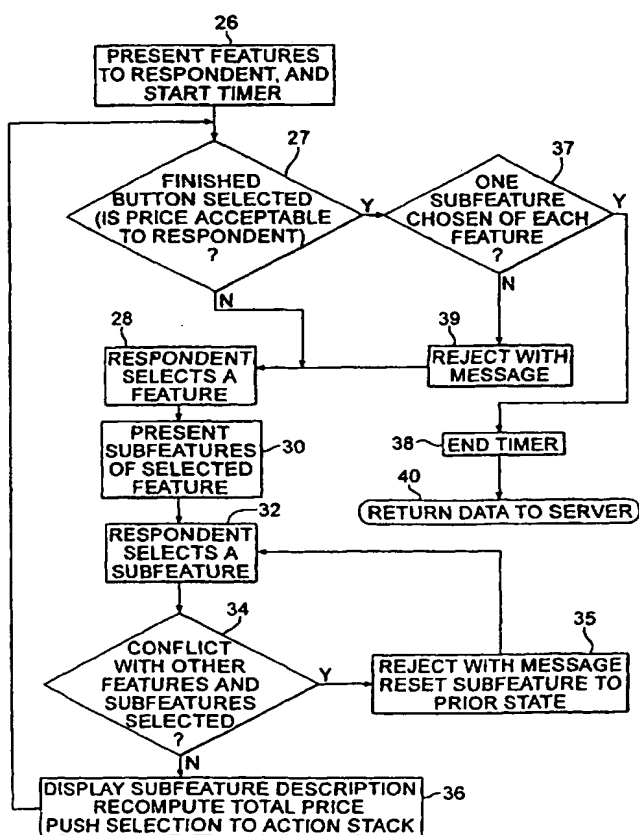
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(54) Title: SYSTEM AND METHOD FOR CONDUCTING PRODUCT CONFIGURATION RESEARCH OVER A COMPUTER-BASED NETWORK



(57) Abstract: A system and method is provided for enabling respondents at their computer systems to connect with a server computer over a network, such as the Internet, and receive an executable configuration program enabling each respondent to select for each of the features of a product one of multiple subfeature attributes or levels for that feature. Each of the subfeatures for each feature has a price value and the combination of selected subfeatures for the features of the product provides a total price value of the product. The total price value is displayed and updated as subfeatures for the features are selected by the respondent or the selection of subfeatures are changed by the respondent. When the total price value of the product is acceptable to the respondent, and subfeatures have been selected for each feature of the product, the program returns configuration information to the computer server having data representing the subfeatures selected for the product, the total price of the product, the time for the respondent to complete the configuration of the product, and each of the features and subfeatures selected and changed by the respondent in arriving at the final configured product. The configuration program may be part of a survey being conducted over the network by the server computer in which questions of the survey following receipt of the configuration information by the computer server may be in accordance with such configuration information.

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System And Method For Conducting Product Configuration Research
Over A Computer-based Network

Description

5

Field of the Invention

The present invention relates to a system and method for conducting product configuration research over a computer-based network, and particular to, a system and method for conducting product configuration research over a computer-based network by respondents at their computers to enable each respondent to configure a product and then provide information about the configuration of the product to a server computer over the network. The invention is useful in collecting information regarding consumer preferences about a product efficiently and rapidly to multiple respondents at their computers over a network, such as the Internet.

15

Background of the Invention

Traditional market research does not facilitate obtaining information as to the desired configuration of a product and the price a person will pay for the product as a tradeoff for the preferred configuration. For example, it is difficult for a fast food company to test the market as to best combinations of items in a meal at a price the consumer finds acceptable, until that meal is actually offered. Today, the Internet provides the ability to conduct research to multiple potential respondents, such as by polling or surveys. For example, such surveys are conducted over the Internet by Harris Interactive Inc. of Rochester, N.Y. However, such surveys on computers are primarily in question and answer formats and do not provide the ability of the consumer to configure a preferred product from among features, such as a meal, car, phone service, or any product having multiple features and available attributes, levels, or quantities for such features.

Although web sites on the Internet can enable a customer to configure on-line particular types of products, such as a computer, such web sites are directed to sales of products, and not for market research in testing preferences of consumers in the configuration of products. The consumer is merely provided with a check off list of the features available, and is not provided with an updated price in real-time as such features are selected or changed, unless the effect of price of each feature is provided to the consumer and the

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Briefly described, the system embodying the present invention includes at least one server computer system connected to a network, and at least one client computer system capable of connecting to the server computer system through the network in which the server computer system sends, via the network, to the client computer system an executable
5 program. The program when executed by the client computer system enables a respondent (person or user) at the client computer system, using the client computer system's display and graphical user interface, such as a mouse, to configure the product by selecting at least one of the subfeatures (attributes or levels) for each of the features of the product, and allowing the selected subfeatures to be changed by the respondent until the product is configured with final
10 ones of the selected subfeatures. Each of the possible subfeatures for each feature of the product has a price value, and the combination of the selected subfeatures provides a total price value of the product as the respondent selects or changes the selection of the subfeatures for each of the features of the product. The total price value may be determined based on a total price formula combining the price values of selected subfeatures. For example, such a
15 formula may be a summation of the price values of the selected subfeatures adjusted to account for the effects on the total price by certain combinations of selected subfeatures for features, or simply a summation of price values of selected subfeatures without such adjustment. The total price value is displayed and updated as subfeatures are selected or changed. A finished button is provided to the respondent which when selected (e.g., clicked
20 by mouse) indicates that the respondent has completed the configuration of the product in that the total price value displayed is acceptable to the respondent for the final ones of the subfeatures selected for the product's features. The program has a timer to determine the elapsed time for the respondent to configure the product until the finished button is selected. A list or stack in memory of the client computer system stores all selected subfeatures for the
25 features of the product. This list is appended to each time a subfeature is selected so as to add the selected subfeature and associated feature, and thus records all changes, if any, in selected subfeatures until the final ones of the selected subfeatures are arrived at by the respondent. Data representing configuration information is sent to the computer server when the respondent has configured the product and the finished button is selected, including, at least
30 the final selected subfeatures for the features of the product, all selected subfeatures for features of the product until the final ones of the selected subfeatures, and the elapsed time of

- 5 -

price value, the elapse time, and a list of each of the selected subfeatures and the associated selected feature to provide the steps taken by the respondent in arriving at the configured product. The configuration information is stored at the another computer system.

The configuration information returned from a user is useful in augmenting tradeoff
5 research techniques, such as Conjoint and Discrete Choice Analysis.

Brief Description of the Drawings

The foregoing features and advantages of the invention will become more apparent
10 from a reading of the following description in connection with the accompanying drawings in which:

FIG. 1 is a block diagram of the system in accordance with the present invention showing a computer server coupled to one or more client computer systems via a computer-based network;

FIG. 2 is a flow diagram of the operation of the system of FIG. 1 over a network in
15 which the right side represents the processing of the computer server and the left side represents the processing at one of the client computer system;

FIG. 3 is a flow chart of the of the configuration program downloaded and executed in FIG. 2 at one of the client computer systems of FIG. 1;

FIG. 4 is a display screen of the configuration program of FIG. 3 for an example of a
20 meal having multiple features prior to selection of subfeature attributes or levels for any of the features;

FIGS. 5A and 5B are display screens in the example of FIG. 4 in which the respondent has selected a different subfeature in each figure for the same feature and resulting total price change for the product;

25 FIG. 6 is a display screen in the example of FIG. 4 showing an error message occurring when the respondent has not selected a subfeature for each feature when the respondent inappropriately indicates completion of product configuration by selecting a finished button;

FIG. 7 is a display screen in the example of FIG. 4 when a conflict occurs in the
30 selection of subfeatures for product features by the respondent; and

FIG. 8 is a display screen in the example of FIG. 4 when each of the subfeatures has been selected for each feature of the product.

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fields for entry of alphanumeric characters. The survey may be conducted over a network such as described, for example, in International Application No. PCT/US00/02623, filed February 2, 2000, having Publication No. WO 00/46699 and priority to U.S. Patent Application No. 09/243,064, filed February 2, 1999, now U.S. Patent No. 6,311,190, which is
5 herein incorporated by reference. The answers received to the questions are stored in memory (RAM or hard drive, or other typical storage unit) of the server computer 12. The server computer 12 may tabulate or tally the selected answers for the survey, or store specific answers for that survey in its memory.

Next, the server computer 12 assembles the configurator program (or software) (step
10 18). The configurator program represents a program, such as in JavaScript language, as will be described in more detail in connection with FIG. 3. The configurator program enables a respondent to select features of a product and subfeatures (attributes or levels) for each of the features, and displays the total price of the product as subfeatures are selected and deselected. The product title; text (names), graphics, or images, of the features and subfeatures of the
15 product, descriptions (text, graphics, or images) associated with each of the features and subfeatures, prices of the subfeatures, a formula for determining the total price, and a conflict matrix of the combinations of features and subfeatures representing conflicts, represent parameters which may be stored in memory of the server computer 12 separate from the program. Each survey, for example, may be for a different product (or version of the product)
20 and thus have different parameters. The configuration program when assembled at step 18 merges the particular parameters for a given survey into the program, such that the program will operate using those parameters. Once assembled, the configurator program is temporarily stored in the server computer 12 for download to a client computer system 14. The configurator program is issued to the client computer system 14 by formatting it into a HTML
25 document as a JAVA applet and then the HTML document being downloaded into memory (RAM) of the client computer system (step 19), where it is automatically executed by browser software and displayed on the display of the client computer system 14.

Using the configurator program, the respondent configures the product's subfeatures (attributes or levels) for each feature of the product, and then returns (sends) data representing
30 configuration information based on the configured product to the server computer (step 20). The data sent by the client computer system 14 is received by the server computer 12 (step 22). The received data with the configuration information represents, the final configured

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four possible subfeatures are present for a feature. For example, the pair of (4,2) would represent the fourth feature having second subfeature selected. An Action Stack in memory of the client computer system records in a list each pair of feature and subfeatures selected by a respondent during the configuration of the product. This list is used to show all the steps of the respondent made in arriving at the final configured product. An Array (or list) in memory of the client computer system stores in a single-dimensional array the current selected subfeatures of the product in which the position in the array corresponds to the features. If no subfeature has been selected, its entry in this Array is zero. For example, a product with four features before selection of any subfeatures is (0,0,0,0), and then after the selection of subfeature for each feature may be (3,2,1,2) in which the third subfeature is selected for the first feature, the second subfeature is selected for the second feature, and so forth. Other data structures may be used to store the current selected subfeatures in memory of the client computer system, and thus the data structure is not limited to an array (or list). The text (name) or representative graphics or images of each feature and its subfeatures with associated descriptive text, graphics, or images are provided in memory as part of the configuration program, along with the price of each subfeature. A total price variable in memory of the client computer system maintains the total price of the product based on a computational formula, such as a summation of the price of each of the subfeatures selected.

The total price formula is illustrated by the following examples. In these examples there are four features 1 to 4, where: $(x,y) = 1$ if feature x and subfeature y is selected by the respondent, otherwise $(x,y) = 0$; $[x,y]$ represents the price value of feature x , subfeature y ; and $[x,-]$ represents the price value of whatever subfeature is chosen of feature x .

Example 1: summation of the price values of the subfeatures selected:

$$\text{Total Price} = [1,-] + [2,-] + [3,-] + [4,-]$$

Example 2: feature four (e.g., toy) is free if the highest subfeature, i.e., 4, of feature 1 (e.g., number of nuggets) is selected:

$$\text{Total Price} = [1,-] + [2,-] + [3,-] + [4,-] - [4,-]*(1,4)$$

Example 3: price is increased by 10% if the lowest subfeatures (or levels) of features 1, 2, and 3 are selected:

$$\text{Total Price} = [1,-] + [2,-] + [3,-] + [4,-] * (1 + 0.10 * (1,1) * (2,1) * (3,1))$$

As these examples show, the particular total price formula (or equation) used for a given product configuration in the configuration program is adaptable.

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system is over the identifying text of the subfeature to be selected, the subfeature is highlighted (as shown in FIG. 5A for the second one of the listed subfeatures 46a), and descriptive text, graphics, or images providing an explanation of the specific subfeature selected is provided in a subfeatures explanation box 47 (as shown in FIG. 5A by description 5 47b). Until the respondent selects a subfeature, text 47a (FIG. 4) may be provided in the subfeatures explanation box 47 informing "no selection currently". An asterisk "*" may be provided next to the text identifying each feature in box 44 to indicate to the respondent when no subfeature has yet been selected for that feature.

The feature and subfeature selected are checked for conflicts with the other current 10 selected features and subfeatures, if any (step 34). As stated earlier, an Array stores the current selected subfeatures for each of the features. The combination of the features having non-zero subfeatures in this Array, and the feature and subfeature under selection, is checked against a matrix of conflict combination of pairs of feature and subfeatures. For example, the 15 conflict matrix in the chicken meal example may be as follows: Conflict: Smallest number, subfeature 1, of feature 1, chicken nuggets, (1,1) will never be served with largest, subfeature 4, of feature 2, side dish, (2,4) or largest, subfeature 3, of feature 3, soft drink, (3,3), – the conflict matrix is (1,1,2,4) (1,1,3,3). Thus, in this example, if the respondent first selected feature and subfeature pair is (1,1) and then later the respondent selects feature and subfeature pair (2,4) or (3,3), the client computer system upon checking the conflict matrix for any 20 combinations of pairs of such features and subfeatures would determine the existence of a conflict.

If an entry in the conflict matrix exists which a combination of one or more features and selected subfeatures in the Array with the feature and subfeature under selection, a reject message is provided to the respondent indicating the one or more current features and 25 subfeatures are in conflict with the feature and subfeature under selection (step 35). FIG. 7 shows for example a screen 52 on the display 41 of window 42 showing a conflict message 54. The respondent must then click on the continue button 55 to return to the previous screen at step 32, where the subfeature causing the conflict is reset to the prior state, thereby avoiding the conflict. In other words, the subfeatures in box 46 of window 42 are shown with the 30 selected subfeature, if any, highlighted as stored in Array, and thus resets the respondent's selection to that before the conflict occurred. If no conflict exists (step 34), the selected subfeature is highlighted, its description (explanation) presented in box 47, the Array of

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highlighted (e.g., change in background and/or text color), is used to show selection of feature or subfeature, any other means may be used to show such selection, such as an adjacent check symbol, or other graphical effect. When the respondent has complete making their subfeature selections for each subfeature and the final cost of the product is acceptable to the respondent, as shown for the meal example in FIG. 8 for the final cost of \$3.06, the respondent indicates completion of the configuration of the product by clicking on the finished button 48.

If the finished button 48 is selected (step 27), the computer checks the Array of current selected subfeatures to determine if each feature has a selected (non-zero) subfeature (step 37). If a subfeature has been selected for every feature of the product, the software timer is stopped (step 38) and data representing the configuration information is sent to the server computer 12 (step 40). This data includes the values of selected subfeatures in Array, the value of the total price variable, the timer value in minutes and seconds of elapsed time, and the (feature, subfeature) pairs from the Action Stack indicating each step taken to the final configured product. If a subfeature has not been selected for each feature (step 37), the respondent is informed with a reject message 56 indicating the error (step 39), as shown for example in FIG. 6, and respondent by selecting the OK button 58 in the message continues to select a subfeature for each feature at steps 28-32.

The configuration program is shown as a flow chart in FIG. 3 for illustration purposes. It may operate based on states in which the state of the program changes upon input, i.e., selected feature, subfeature, or finished button, as shown, for example, in FIGS. 4, 5A, 5B, and 6-8. Although a meal is provided in the above example, any product having features and subfeatures may similarly be provided to a respondent for selection of subfeatures.

Although each feature has subfeatures, one or more features may be provided with no subfeatures, in which the selection of such features provides a price value included in the total price formula calculation, and such features may optionally be selected by the respondent. Thus step 37 in FIG. 3 would be relevant only to features having subfeatures, and the Array would record the status of a feature without subfeatures as being selected or not by the respondent at a position in the Array having a 1 or 0, respectively. The Action Stack can record selection or deselection of a feature without subfeatures by the pair of the feature, and selection status (1 or 0). Such a pair of feature and selection status could be combined with other pair(s) of feature and subfeature to represent a conflict in the conflict matrix.

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Claims

1. A system for conducting product configuration research at computer systems over a network for a product having multiple features and for each feature a plurality of possibly subfeatures, said system comprising:

5 at least one first computer system connected to said network;

at least one second computer system capable of connecting to said first computer system through said network;

said first computer system sending an executable program via said network to said second computer system;

10 said program being executed by said second computer system and comprising:

means for enabling a respondent at the second computer system to configure the product by selecting at least one subfeature for each of the features of the product, and allowing the selected subfeatures to be changed by the respondent until the product is configured with final ones of the selected subfeatures, in which each of the possible subfeatures of the features of the product has a price value;

15 means for determining a total price value of the product in accordance with the price value of the selected subfeature for each of the features of the product as the respondent selects or changes the selection of the subfeatures for each of the features of the product, and displaying said total price value;

20 means for determining the time for the respondent to configure the product with the final ones of said selected subfeature for each of the features of the product; and

means for sending configuration information to the first computer system when the respondent has configured the product having at least the final selected subfeatures for the features of the product, all selected subfeatures for the features of the product until the final ones of the selected subfeatures, and said determined time; and

25 said first computer system having means for storing said configuration information received from said second computer system.

2. The system according to Claim 1 wherein said first computer system sends a survey having questions to said second computer system associated with said sent executable program, and said first computer system further comprises means for enabling the respondent

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g) repeating steps (b), (c), (d), (e) and (f) for different selected displayed features until the selected subfeatures for each of the features provide a total price value acceptable to the respondent;

h) determining the elapse time until the selected subfeatures for each of the features provide a total price value acceptable to the respondent; and

i) sending configuration information to another computer system over the network representing at least said selected subfeatures for the features of the product, total price value, and the elapse time.

10 9. The method according to Claim 8 further comprising the step of maintaining a list of each of the selected subfeatures and the associated selected feature after each of the selected subfeatures are selected until the selected subfeatures for each of the features provide a total price value acceptable to the respondent, wherein said configuration information further comprises said list.

15

10. The method according to Claim 8 further comprising the step of storing said configuration information at said another computer system.

20 11. The method according to Claim 8 further comprising the steps of:
answering questions of a survey in which one or more of said questions relate to said product; and
sending the answers to said questions to said another computer system.

25 12. The method according to Claim 8 further comprising the steps of:
determining when one of the subfeatures selected for features of the product represent a conflict with said selected subfeatures for other features of the product;
providing a message informing the respondent when said selected subfeature represent said conflict; and
resetting the selection of the subfeature causing the conflict to avoid the conflict.

30

13. Software for enabling product configuration research executable at a computer system comprising:

- 19 -

means for determining the time for the respondent to configure the product with the final ones of said selected subfeature for each of the features of the product; and

means for determining configuration information when the respondent has configured the product having at least the final selected subfeatures for the features of the product, all selected subfeatures for the features of the product until the final ones of the
5 selected subfeatures, and said determined time.

17. A system for enabling a respondent to configure a product over a network comprising a computer system enabling the respondent to configure a product by selecting
10 features and subfeatures for the features of the product, recording changes in each of the selected features and subfeatures until the product is configured, and sending over the network to another computer system configuration information representative of at least the selected features and subfeatures of the product, and said recorded changes in selected features and subfeatures of the product.

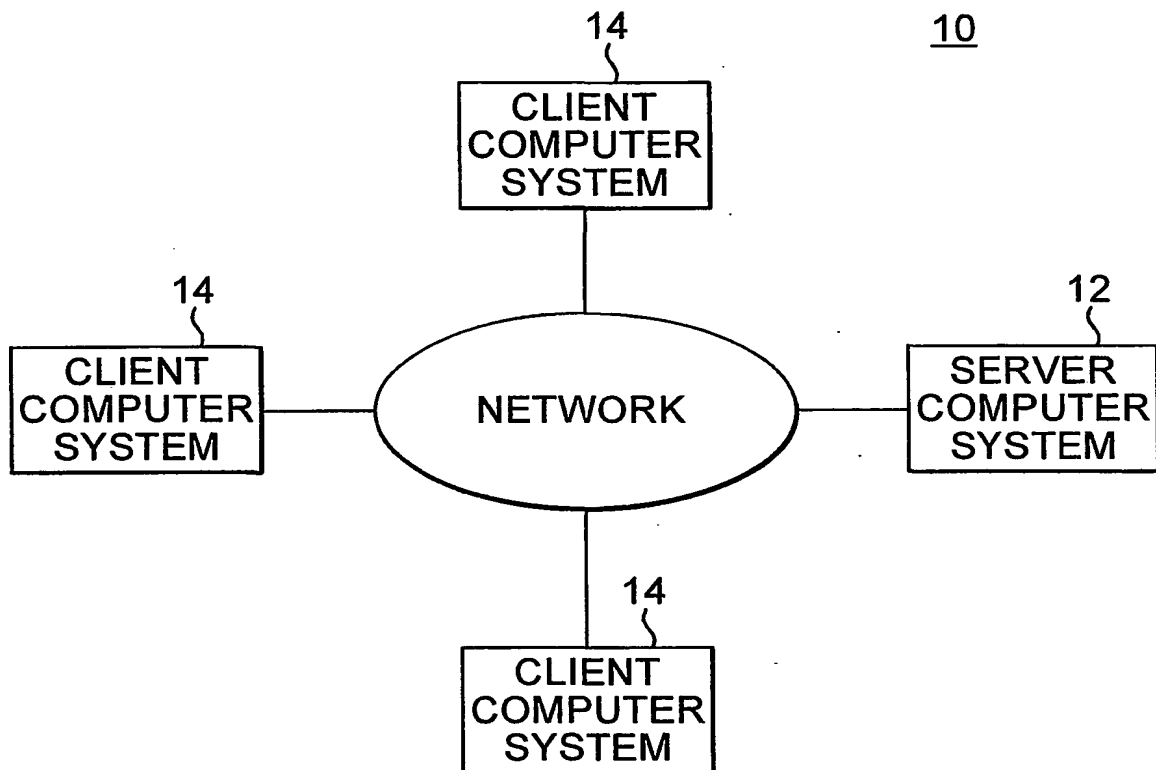
15

18. The system according to Claim 17 wherein each said subfeature for each of the features has a price value, and said computer system determines a total price value representing a combination of the price values of each selected subfeature, and displays the total price value as subfeatures are selected or the selection of subfeatures are changed.

20

19. The system according to Claim 17 wherein said computer system has a timer for measuring the time for the respondent to configure the product, and said configuration information further comprises said determined time.

1/9

**FIG. 1**

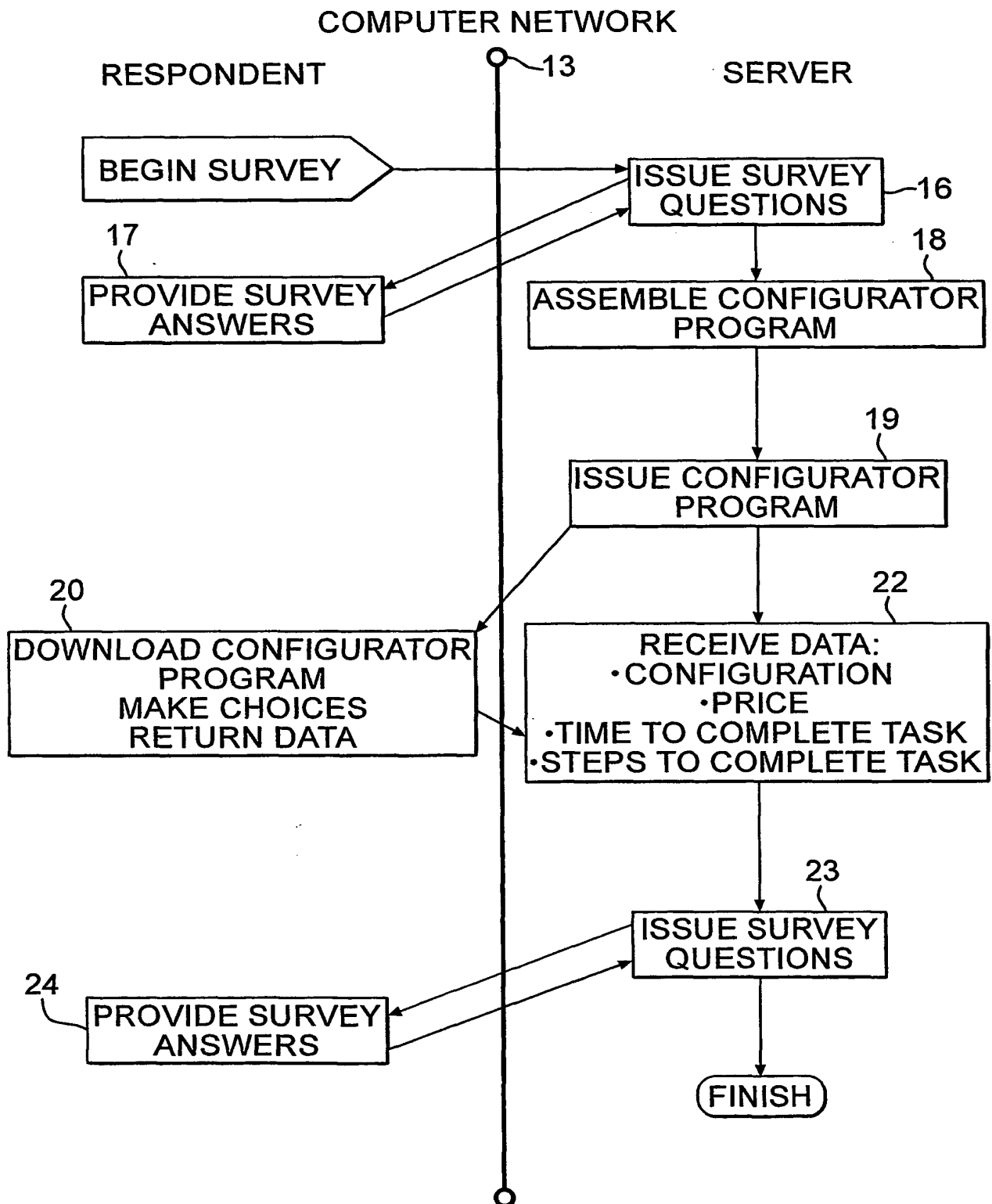
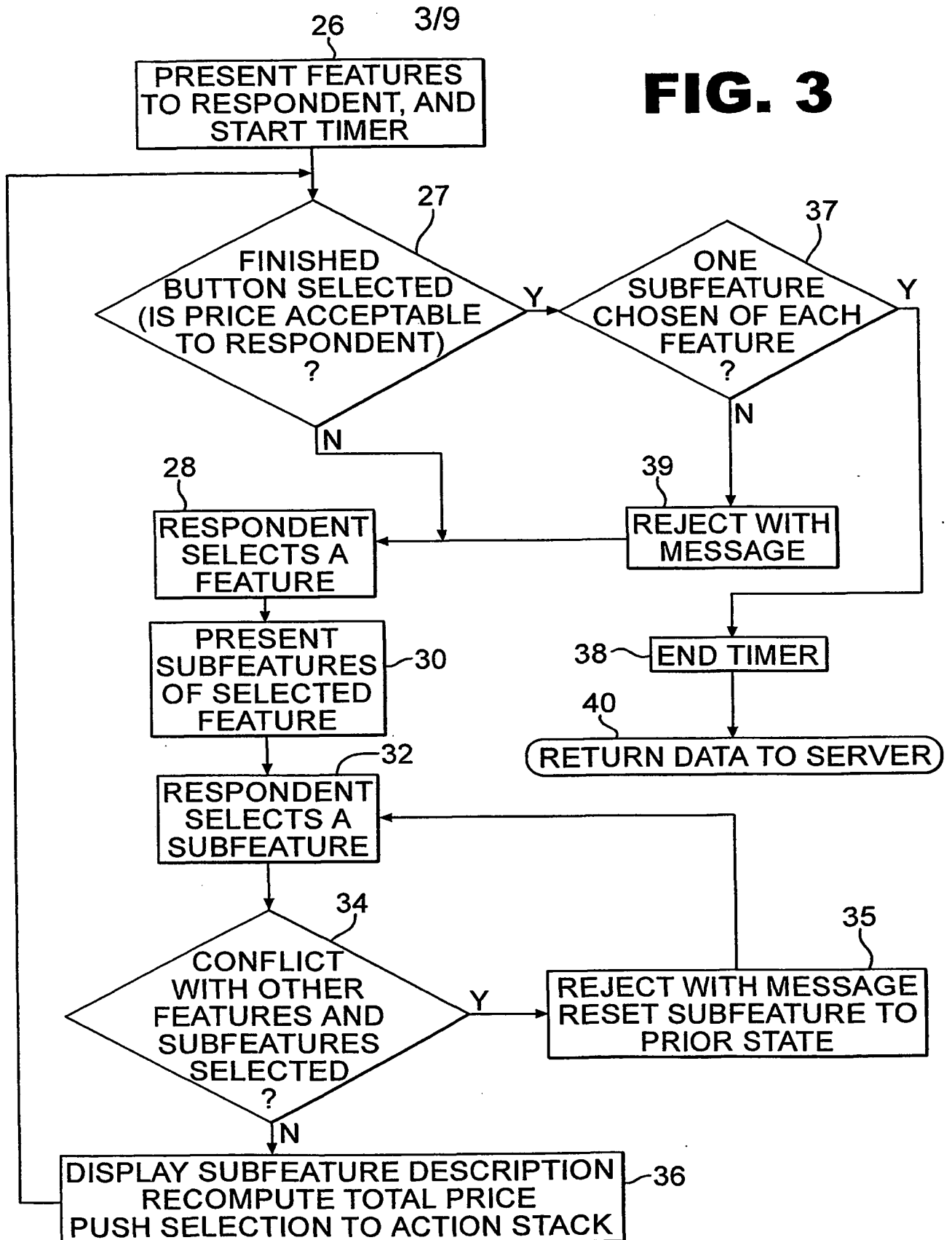


FIG. 2

FIG. 3

41

FILE EDIT VIEW FAVORITE TOOLS HELP

42

ADDRESS

GO

CONFIGURATOR

4/9

45

47

50a

50b

44b

44a

44

46a

46

47c

48

49

CHICKEN NUGGETS*

SIDE DISH*

SOFT DRINK*

TOY*

POSSIBLE CHICKEN MEAL FEATURES

EXPLANATION OF FEATURES

NUMBER OF CHICKEN NUGGETS IN BOX

OPTIONS WITHIN FEATURES

EXPLANATION OF OPTIONS

NO SELECTION CURRENTLY

FINISHED

APPLET STARTED

FIG. 4

41

42

5/9

45

47

44a

44

46a

46

48

45a

FILE EDIT VIEW FAVORITE TOOLS HELP

ADDRESS

GO

CONFIGURATOR

TOTAL COST OF MEAL FEATURES SELECTED IN US\$

50 ~ \$1.28

POSSIBLE CHICKEN MEAL FEATURES

EXPLANATION OF FEATURES

CHICKEN NUGGETS

SIDE DISH*

SOFT DRINK*

TOY*

NUMBER OF CHICKEN NUGGETS IN BOX

45a

OPTIONS WITHIN FEATURES

EXPLANATION OF OPTIONS

3

4

5

6

THE BIG FOUR ~ 47b

FINISHED ~ 48

FIG. 5A

FILE EDIT VIEW FAVORITE TOOLS HELP
6/9

ADDRESS
GO

CONFIGURATOR

TOTAL COST OF MEAL FEATURES SELECTED IN US\$

\$1.90

POSSIBLE CHICKEN MEAL FEATURES	EXPLANATION OF FEATURES	EXPLANATION OF OPTIONS
CHICKEN NUGGETS	NUMBER OF CHICKEN NUGGETS IN BOX } 45a	
SIDE DISH*		
SOFT DRINK*		
TOY*		

OPTIONS WITHIN FEATURES

3
4
5
6

THE FULL HALF-DOZEN

FINISHED

FIG. 5B

41

FILE EDIT VIEW FAVORITE TOOLS HELP

42

ADDRESS

GO

CONFIGURATOR

TOTAL COST OF MEAL FEATURES SELECTED IN US\$
\$1.90

POSSIBLE CHICKEN MEAL FEATURES

EXPLANATION OF FEATURES

CHICKEN NUGGETS

SIDE DISH*

SOFT DRINK*

TOY*

NUMBER OF CHICKEN NUGGETS IN BOX

56

YOU MUST SELECT A FEATURE OF EVERY ATTRIBUTE

58

OK

OPTIONS

3

4

5

6

OPTIONS

FINISHED

FIG. 6

41

FILE EDIT VIEW FAVORITE TOOLS HELP

ADDRESS

GO

42

8/9

CONFIGURATOR

TOTAL COST OF MEAL FEATURES SELECTED IN US\$

50 ~ \$0.98

THERE IS A CONFLICT IN THE CHOICES YOU HAVE MADE:

54 {

SIDE DISH
HASH BROWNS

CONFLICTS WITH:

CHICKEN NUGGETS
3

CONTINUE ~ 55

FINISHED ~ 48

FIG. 7

FILE

EDIT

VIEW

FAVORITE

TOOLS

HELP

↩

↪

⊗

⊙

⊞

⊠

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⊾

⊿

GO

ADDRESS

50

\$3.06

CONFIGURATOR

TOTAL COST OF MEAL FEATURES SELECTED IN US\$

POSSIBLE CHICKEN MEAL FEATURES

EXPLANATION OF FEATURES

CHICKEN NUGGETS

SIDE DISH*

SOFT DRINK*

TOY*

MOVIE PROMOTION TIE-IN

OPTIONS WITHIN FEATURES

EXPLANATION OF OPTIONS

TOY SOLDIER

BEAUTY

LION KING

STAR WARS EPISODE 1

...NOT THE BEAST

FINISHED

48

FIG. 8